

DEEP-SEA RESEARCH

PART I

OCEANOGRAPHIC RESEARCH PAPERS

VOLUME 40, 1993

VOLUME CONTENTS AND AUTHOR INDEX

Editor:

DR MICHAEL P. BACON: *Department of Marine Chemistry and Geochemistry
Woods Hole Oceanographic Institution, Woods Hole, MA 02543, U.S.A.*

Founder Editor: DR MARY SEARS



PERGAMON

DEEP-SEA RESEARCH I

Editor

DR MICHAEL P. BACON: *Department of Marine Chemistry and Geochemistry, Woods Hole Oceanographic Institution, Woods Hole, MA 02543, U.S.A.*

Associate Editors

D. M. ALONGI (*Benthic Biology*)
Australian Institute of Marine Science,
PMB No. 3,
Townsville Mail Centre,
Queensland 4810, Australia

P. H. BURKILL (*Pelagic Foodwebs*)
Plymouth Marine Laboratory,
Prospect Place,
Plymouth PL1 3DH, U.K.

C. GARRETT (*Ocean Physics*)
Department of Physics and Astronomy,
University of Victoria,
P.O. Box 3055,
Victoria, BC,
Canada V8W 3P6

S. M. HENRICHES (*Chemistry*)
Institute of Marine Science,
University of Alaska,
Fairbanks, AK 99775-1080, U.S.A.

J. MARRA (*Productivity*)
Lamont-Doherty Earth Observatory,
Palisades, NY 10964, U.S.A.

P. L. RICHARDSON (*Ocean Circulation*)
Physical Oceanography Department,
Woods Hole Oceanographic Institution,
Woods Hole, MA 02543, U.S.A.

V. SMETACEK (*Vertical Fluxes*)
Alfred-Wegener-Institut für Polar- und
Meeresforschung,
Am Handelshafen 12, D-27570 Bremerhaven,
Germany

Founder Editor: DR MARY SEARS

Production Editor: P. RUSSELL, Elsevier Science Ltd, Oxford OX5 1GB, U.K. (Tel.: 0865 743744)

Publishing, Subscription and Advertising Offices: The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, U.K. (Tel.: 0865 794141)

Published monthly

Second class postage paid at Rahway, NJ. Postmaster send address corrections to Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A.

Annual Institutional Subscription Rates (1994): North, Central and South America, U.S.\$1565.00, Rest of World £1015.00. This includes Part I and Part II (Topical Studies in Oceanography). Associated personal subscription rates are available for those whose institutions are library subscribers. Annual Institutional Subscription Rates (1994) for *Deep-Sea Research* Parts I and II with *Oceanographic Literature Review*: North, Central and South America, U.S.\$2000.00, Rest of World £1298.00. Sterling prices exclude VAT. Non-VAT registered customers in the European Community will be charged the appropriate VAT in addition to the price listed. Prices include postage and insurance and are subject to change without notice.

Subscription enquiries from customers in North America should be sent to: Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A. and for the remainder of the world to: Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, U.K.

Copyright © 1994 Elsevier Science Ltd

Whilst every effort is made by the publishers and editorial board to see that no inaccurate or misleading data, opinion or statement appear in this journal, they wish to make it clear that the data and opinions appearing in the articles and advertisements herein are the sole responsibility of the contributor or advertiser concerned. Accordingly, the publishers, the editorial board and editors and their respective employees, officers and agents accept no responsibility or liability whatsoever for the consequences of any such inaccurate or misleading data, opinion or statement.

Contents of Volume 40

January

EDITORIAL

B. L. BINGHAM and C. M. YOUNG

Y. YOU and M. TOMCZAK

S. L. STROM

T. L. HOPKINS, T. M. LANCRAFT, J. J. TORRES and J. DONNELLY

A. G. DICKSON

O. GUERIN-ANCEY and P. M. DAVID

R. J. M. HUDSON and F. M. M. MOREL

D. THISTLE, B. HILBIG and J. E. ECKMAN

J. C. GOLDMAN

A. H. ORSI, W. D. NOWLIN JR and T. WHITWORTH III

A. SURYANARAYANA, V. S. N. MURTY and D. P. RAO

List of Contents for *Continental Shelf Research*, Vol. 12, No. 11 and No. 12

I

- 1 Larval phototaxis in barnacles and snails associated with bathyal sea urchins
- 13 Thermocline circulation and ventilation in the Indian Ocean derived from water mass analysis
- 57 Production of pheopigments by marine protozoa: results of laboratory experiments analysed by HPLC
- 81 Community structure and trophic ecology of zooplankton in the Scotia Sea marginal ice zone in winter (1988)
- 107 pH buffers for sea water media based on the total hydrogen ion concentration scale
- 119 Use of a multibeam-multifrequency sounder to study the distribution of small zooplankton
- 129 Trace metal transport by marine microorganisms: implications of metal coordination kinetics
- 151 Are polychaetes sources of habitat heterogeneity for harpacticoid copepods in the deep sea?
- 159 Potential role of large oceanic diatoms in new primary production
- 169 On the circulation and stratification of the Weddell Gyre
- 205 Hydrography and circulation of the Bay of Bengal during early winter, 1983

i

February

D. A. HANSELL, P. M. WILLIAMS and B. B. WARD

D. NOF and D. B. OLSON

U. SCHÜBLER and K. KREMLING

M. RHEIN and H. H. HINRICHSEN

- 219 Measurements of DOC and DON in the Southern California Bight using oxidation by high temperature combustion
- 235 How do western abyssal currents cross the equator?
- 257 A pumping system for underway sampling of dissolved and particulate trace elements in near-surface waters
- 267 Modification of Mediterranean Water in the Gulf of Cadiz, studied with hydrographic, nutrient and chlorofluoromethane data

W. E. JOHNS, D. M. FRATANTONI and R. J. ZANTOPP	293	Deep western boundary current variability off northeastern Brazil
D. L. GARRISON, K. R. BUCK and M. M. GOWING	311	Winter plankton assemblage in the ice edge zone of the Weddell and Scotia Seas: composition, biomass and spatial distributions
M. M. RUTGERS VAN DER LOEFF and G. W. BERGER	339	Scavenging of ^{230}Th and ^{231}Pa near the Antarctic Polar Front in the South Atlantic
K. D. STOLZENBACH	359	Scavenging of small particles by fast-sinking porous aggregates
G. C. JOHNSON and J. M. TOOLE	371	Flow of deep and bottom waters in the Pacific at 10°N
F. THOMAS, J. F. MINSTER, P. GASPAR and Y. GREGORIS	395	Comparing the behaviour of two ocean surface models in simulating dissolved O_2 concentration at O.W.S.P.

Notes

M. L. GRÜNDLINGH	409	On the winter flow in the southern Mozambique Channel
H. THIEL, G. SCHRIEVER, C. BUSSAU and C. BOROWSKI	419	Manganese nodule crevice fauna

List of Contents for *Continental Shelf Research*, Vol. 13, No. 1 and No. 2/3

i

March

P. J. MÜLLER and R. SCHNEIDER	425	An automated leaching method for the determination of opal in sediments and particulate matter
J. M. NAPP, P. B. ORTNER, R. E. PIEPER and D. V. HOLLIDAY	445	Biovolume-size spectra of epipelagic zooplankton using a Multi-frequency Acoustic Profiling System (MAPS)
C. J. ASHJIAN	461	Trends in copepod species abundances across and along a Gulf Stream meander: evidence for entrainment and detrainment of fluid parcels from the Gulf Stream
C. J. ASHJIAN and K. F. WISHNER	483	Temporal persistence of copepod species groups in the Gulf Stream
M. M. GOWING	517	Seasonal radiolarian flux at the VERTEX North Pacific time-series site
B. HAAKE, V. ITTEKKOT, S. HONJO and S. MANGANINI	547	Amino acid, hexosamine and carbohydrate fluxes to the deep Subarctic Pacific (Station P)
V. V. GOURETSKI and A. I. DANILOV	561	Weddell Gyre: structure of the eastern boundary
H. ICHIKAWA and R. C. BEARDSLEY	583	Temporal and spatial variability of volume transport of the Kuroshio in the East China Sea

Instruments and Methods

E. A. WIDDER, J. F. CASE, S. A. BERNSTEIN, S. MACINTYRE, M. R. LOWENSTINE, M. R. BOWLBY and D. P. COOK

J. A. BRELAND II and R. H. BYRNE

607 A new large volume bioluminescence bathy-photometer with defined turbulence excitation

629 Spectrophotometric procedures for determination of sea water alkalinity using bromocresol green

April

C. M. TURLEY, A. J. GOODAY and J. C. GREEN

J. P. JASPER and W. G. DEUSER

N. S. FISHER and M. WENTE

C. STEFANESCU, D. LLORIS and J. RUCABADO

C. SAVENKOFF, L. PRIEUR, J.-P. REYS, D. LEFEVRE, S. DALLOT and M. DENIS

O. PFANNKUCHE and K. LOCHTE

M. MELLES and G. KUHN

D. V. BOROLE

D. QUADFASEL, A. SY and B. RUDELS

P. RAIMBAULT, B. COSTE, M. BOULHADID and B. BOUDJELLAL

M. D. KROM, S. BRENNER, N. KRESS, A. NEORI and L. I. GORDON

J. SPRINTALL and M. TOMCZAK

643 Maintenance of abyssal benthic foraminifera under high pressure and low temperature: some preliminary results

653 Annual cycles of mass flux and isotopic composition of pteropod shells settling into the deep Sargasso Sea

671 The release of trace elements by dying marine phytoplankton

695 Deep-sea fish assemblages in the Catalan Sea (western Mediterranean) below a depth of 1000 m

709 Deep microbial communities evidenced in the Liguro-Provençal front by their ETS activity

727 Open ocean pelago-benthic coupling: cyanobacteria as tracers of sedimenting sulp faeces

739 Sub-bottom profiling and sedimentological studies in the southern Weddell Sea, Antarctica: evidence for large-scale erosional/depositional processes

761 Late Pleistocene sedimentation: a case study of the central Indian Ocean Basin

777 A ship of opportunity section to the North Pole: upper ocean temperature observations

791 Origin of high phytoplankton concentration in deep chlorophyll maximum (DCM) in a frontal region of the Southwestern Mediterranean Sea (Algerian Current)

805 Nutrient distributions during an annual cycle across a warm-core eddy from the E. Mediterranean Sea

827 On the formation of Central Water and thermocline ventilation in the southern hemisphere

Instruments and Methods

M. BASKARAN, D. J. MURPHY, P. H. SANTSCHI, J. C. ORR and D. R. SCHINK

J. DUNN, C. D. HALL, M. R. HEATH, R. B. MITCHELL and B. J. RITCHIE

849 A method for rapid *in situ* extraction and laboratory determination of Th, Pb, and Ra isotopes from large volumes of seawater

867 ARIES—a system for concurrent physical, biological and chemical sampling at sea

Note

Y.-H. PARK, L. GAMBERONI,
E. CHARRIAUD and J. GONELLA

List of Contents for *Continental Shelf Research*, Vol. 13, No. 4

879 Does "Novara Knoll" exist?

i

May

M. R. ROMAN, H. G. DAM,
A. L. GAUZENS and J. M. NAPP

T. C. MALONE, S. E. PIKE and
D. J. CONLEY

K. G. SPEER

E. V. THUESEN and J. J. CHILDRESS

R. DANOVARO, M. FABIANO and
N. D. CROCE

D. L. KIRCHMAN, R. G. KEIL, M. SIMON
and N. A. WELSCHMEYER

C. R. QUÉTEL, E. REMOUDAKI,
J. E. DAVIES, J.-C. MIQUEL,
S. W. FOWLER, C. E. LAMBERT,
G. BERGAMETTI and P. BUAT-MÉNARD

P. K. PROBERT and D. G. McKNIGHT

R. MILLARD, G. BOND and J. TOOLE

J.-Z. ZHANG and F. J. MILLERO

N. H. MORLEY, P. J. STATHAM and
J. D. BURTON

J. H. CHURCHILL, E. R. LEVINE,
D. N. CONNORS and P. C. CORNILLON

L. WESTERHAUSEN, J. POYNTER,
G. EGLINTON, H. ERLENKEUSER and
M. SARNTHEIN

Note

S. D. IYER and M. SUDHAKAR

883 Zooplankton biomass and grazing at the JGOFS
Sargasso Sea time series station

903 Transient variations in phytoplankton productivity at
the JGOFS Bermuda time series station

925 The deep silica tongue in the North Atlantic

937 Metabolic rates, enzyme activities and chemical
compositions of some deep-sea pelagic worms,
particularly *Nectonemertes mirabilis* (Nemertea;
Hoplonemertinea) and *Poeobius meseres* (Annelida;
Polychaeta)

953 Labile organic matter and microbial biomasses in
deep-sea sediments (Eastern Mediterranean Sea)

967 Biomass and production of heterotrophic
bacterioplankton in the oceanic subarctic Pacific

989 Impact of atmospheric deposition on particulate iron
flux and distribution in northwestern Mediterranean
waters

1003 Biomass of bathyal macrobenthos in the region of the
Subtropical Convergence, Chatham Rise, New
Zealand

1009 Implementation of a titanium strain gauge pressure
transducer for CTD applications

1023 The chemistry of the anoxic waters in the Cariaco
Trench

1043 Dissolved trace metals in the southwestern Indian
Ocean

1063 Mixing of shelf, slope and Gulf Stream water over the
continental slope of the Middle Atlantic Bight

1087 Marine and terrigenous origin of organic matter in
modern sediments of the equatorial East Atlantic: the
 $\delta^{13}\text{C}$ and molecular record

1123 Coexistence of pumice and manganese nodule
fields—evidence for submarine silicic volcanism in
the Central Indian Basin

i

List of Contents for *Continental Shelf Research*, Vol. 13, No. 5/6

June

Rapid Response Paper

A. L. ALLDREDGE, U. PASSOW and
B. E. LOGAN

Research Papers

B. J. BURD and R. E. THOMSON

K. KREMLING and P. STREU

M. A. DE ANGELIS, M. D. LILLEY,
E. J. OLSON and J. A. BAROSS

D.-P. WANG

R. J. GEIDER, R. M. GREENE,
Z. KOLBER, H. L. MACINTYRE and
P. G. FALKOWSKI

J. SVAVARSSON, G. GUDMUNDSSON and
T. BRATTEGARD

A. FIALA-MÉDONI, J. BOULÈGUE,
S. OHTA, H. FELBECK and A. MARIOTTI

M. KAWASE

H. R. VALENTINE, J. R. E. LUTJEHARMS
and G. B. BRUNDRIT

Instruments and Methods

M. H. C. STOLL, J. W. ROMMETS and
H. J. W. DE BAAR

1131 The abundance and significance of a class of large,
transparent organic particles in the ocean

1141 Flow volume calculations based on three-dimensional
current and net orientation data

1155 Saharan dust influenced trace element fluxes in deep
North Atlantic subtropical waters

1169 Methane oxidation in deep-sea hydrothermal plumes
of the Endeavour Segment of the Juan de Fuca Ridge

1187 The Strait of Gibraltar Model: internal tide, diurnal
inequality and fortnightly modulation

1205 Fluorescence assessment of the maximum quantum
efficiency of photosynthesis in the western North
Atlantic

1225 Feeding by asellote isopods (Crustacea) on
foraminifers (Protozoa) in the deep sea

1241 Source of energy sustaining the *Calyptogena*
populations from deep trenches in subduction zones
off Japan

1259 Topographic effects on the bottom water circulation of
the western tropical North Atlantic Ocean

1285 The water masses and volumetry of the southern
Agulhas Current region

1307 Effect of selected calculation routines and dissociation
constants on the determination of total carbon dioxide
in seawater

July

EDITORIAL

I

Rapid Response Paper

B. HAAKE, V. ITTEKKOT, T. RIXEN,
V. RAMASWAMY, R. R. NAIR and
W. B. CURRY

Research Papers

A. A. BIANCHI, C. F. GIULIVI and
A. R. PIOLA

G. BUDÉUS and G. KRAUSE

E. PASCHINI, A. ARTEGIANI and
N. PINARDI

1323 Seasonality and interannual variability of particle
fluxes to the deep Arabian Sea

1345 Mixing in the Brazil–Malvinas Confluence

1359 On-cruise calibration of XBT probes

1365 The mesoscale eddy field of the Middle Adriatic Sea
during fall 1988

S. L. GARZOLI

C. SAYDAM, S. TUGRUL, O. BASTURK and T. OGUZ

G. ZHUANG and R. A. DUCE

M. DAGG

G. A. CANNON, D. J. PASHINSKI and M. R. LEMON

D. RISOVIĆ

C. M. YOUNG, P. A. TYLER, R. H. EMSON and J. D. GAGE

G. MALIN, S. TURNER, P. LISS, P. HOLLIGAN and D. HARBOUR

Instruments and Methods

H. A. CHRISTIAN, D. E. HEFFLER and E. E. DAVIS

Note

A. E. HILL and E. G. MITCHELSON-JACOB

List of Contents for *Continental Shelf Research*, Vol. 13 No. 7

i

August

S. L. CLEGG and M. WHITFIELD

J. FISCHER and M. VISBECK

J. F. GENDRON, J. P. COWEN, R. A. FEELY and E. T. BAKER

J. K. COCHRAN, K. O. BUSSELER, M. P. BACON and H. D. LIVINGSTON

T. OGUZ, V. S. LATUN, M. A. LATIF, V. V. VLADIMIROV, H. İ. SUR, A. A. MARKOV, E. ÖZSOY, B. B. KOTOVSHCHIKOV, V. V. EREMEEV and Ü. ÜNLÜATA

G. WEFER and G. FISCHER

1379 Geostrophic velocity and transport variability in the Brazil-Malvinas Confluence

1405 Identification of the oxic/anoxic interface by isopycnal surfaces in the Black Sea

1413 The adsorption of dissolved iron on marine aerosol particles in surface waters of the open ocean

1431 Sinking particles as a possible source of nutrition for the large calanoid copepod *Neocalanus cristatus* in the subarctic Pacific Ocean

1447 Hydrothermal effects west of the Juan de Fuca Ridge

1459 Two-component model of sea particle size distribution

1475 Perception and selection of macrophyte detrital falls by the bathyal echinoid *Stylocidaris lineata*

1487 Dimethylsulphide and dimethylsulphoniopropionate in the Northeast Atlantic during the summer coccolithophore bloom

1509 Lancelot—an *in situ* piezometer for soft marine sediments

1521 Observations of a poleward-flowing saline core on the continental slope west of Scotland

1529 Application of a generalized scavenging model to time series ^{234}Th and particle data obtained during the JGOFS North Atlantic Bloom Experiment

1547 Seasonal variation of the daily zooplankton migration in the Greenland Sea

1559 Age estimate for the 1987 megaplume on the southern Juan de Fuca Ridge using excess radon and manganese partitioning

1569 Thorium isotopes as indicators of particle dynamics in the upper ocean: results from the JGOFS North Atlantic Bloom Experiment

1597 Circulation in the surface and intermediate layers of the Black Sea

1613 Seasonal patterns of vertical particle flux in equatorial and coastal upwelling areas of the eastern Atlantic

R. R. RAO, B. MATHEW and
P. V. HAREESH KUMAR

Instruments and Methods

R. D. BALLARD

A. POISSON and M. H. GADHOUMI

Notes

G. F. LANE-SERFF

A. BIANCHI and J. GARCIN

List of Contents for *Continental Shelf Research*, Vol. 13, No. 8/9

1647 A summary of results on thermohaline variability in the upper layers of the east central Arabian Sea and Bay of Bengal during summer monsoon experiments

1673 The MEDEA/JASON remotely operated vehicle system

1689 An extension of the Practical Salinity Scale 1978 and the Equation of State 1980 to high salinities

1699 On drag-limited gravity currents

1703 In stratified waters the metabolic rate of deep-sea bacteria decreases with decompression

1711 Letter to the Editor

i

September

PUBLISHER'S NOTE

Research Papers

B. VAN OS, H.-J. VISSER,
J. J. MIDDELBURG and G. J. DE LANGE

D. HEBBELN and H. BERNER

J. NEVEUX and F. LANTOINE

B. J. BETT and A. L. RICE

G. C. JOHNSON

P. G. VERITY, D. K. STOECKER,
M. E. SIERACKI and J. R. NELSON

S. BEŞİKTEPE, E. ÖZSOY and
Ü. ÜNLÜATA

J. H. LEE and G. VERONIS

D. BOLTOVSKOY, V. A. ALDER and
A. ABELMANN

R. P. MASON and W. F. FITZGERALD

W. ZENK, K. G. SPEER and N. G. HOGG

List of Contents for *Continental Shelf Research*, Vol. 13, No. 10

i

1713 Occurrence of thin, metal-rich layers in deep-sea sediments: a geochemical characterization of copper remobilization

1731 Surface sediment distribution in the Fram Strait

1747 Spectrofluorometric assay of chlorophylls and phaeopigments using the least squares approximation technique

1767 The feeding behaviour of an abyssal echiuroid revealed by *in situ* time-lapse photography

1781 A deep inertial jet on a sloping bottom near the equator

1793 Grazing, growth and mortality of microzooplankton during the 1989 North Atlantic spring bloom at 47°N, 18°W

1815 Filling of the Marmara Sea by the Dardanelles lower layer inflow

1839 Inversions of data from the thermohaline staircase in the western tropical North Atlantic

1863 Annual flux of Radiolaria and other shelled plankters in the eastern equatorial Atlantic at 853 m: seasonal variations and polycystine species-specific responses

1897 The distribution and biogeochemical cycling of mercury in the equatorial Pacific Ocean

1925 Bathymetry at the Vema Sill

i

October

M. H. CONTE and G. EGLINTON

G. COPIN-MONTÉGUT and B. AVRIL

J. M. TOOLE and B. A. WARREN

R. A. FINE

L. CAMPBELL and D. VAULOT

F. G. PRAHL, R. B. COLLIER,
J. DYMOND, M. LYLE and
M. A. SPARROW

R. D. PINGREE and B. LE CANN

Instruments and Methods

S. NARAYANAN and G. R. LILLY

T. D. CLAYTON and R. H. BYRNE

1935 Alkenone and alkenoate distributions within the euphotic zone of the eastern North Atlantic: correlation with production temperature

1963 Vertical distribution and temporal variation of dissolved organic carbon in the North-Western Mediterranean Sea

1973 A hydrographic section across the subtropical South Indian Ocean

2021 Circulation of Antarctic Intermediate Water in the South Indian Ocean

2043 Photosynthetic picoplankton community structure in the subtropical North Pacific Ocean near Hawaii (station ALOHA)

2061 A biomarker perspective on prymnesiophyte productivity in the northeast Pacific Ocean

2077 Structure of a meddy (Bobby 92) southeast of the Azores

2105 On the accuracy of XBT temperature profiles

2115 Spectrophotometric seawater pH measurements: total hydrogen ion concentration scale calibration of *m*-cresol purple and at-sea results

November/December

Rapid Response Papers

A. J. GOODAY, B. J. BETT and
D. N. PRATT

A. LONGHURST

Full Papers

H.-H. HINRICHSEN and M. RHEIN

J. PINEDA

C. M. TURLEY

B. A. KING and E. B. COOPER

2131 Direct observation of episodic growth in an abyssal xenophyophore (Protista)

2145 Seasonal cooling and blooming in tropical oceans

2167 On the origin and the spreading of the shallow Mediterranean water core in the Iberian Basin

2179 Boundary effects on the vertical ranges of deep-sea benthic species

2193 The effect of pressure on leucine and thymidine incorporation by free-living bacteria and by bacteria attached to sinking oceanic particles

2207 Comparison of ship's heading determined from an array of GPS antennas with heading from conventional gyrocompass measurements

T. DELCROIX

R. G. BARLOW, R. F. C. MANTOURA,
M. A. GOUGH and T. W. FILEMAN

D. NOF

C. AGRA and D. NOF

R. GOERICKE and N. A. WELSCHMEYER

C. CORNET and J.-M. GILI

K. L. SMITH JR, R. S. KAUFMANN and
W. W. WAKEFIELD

R. K. REED, G. V. KHEN, P. J. STABENO
and A. V. VERKHUNOV

T. GAMO, H. SAKAI, J. ISHIBASHI,
E. NAKAYAMA, K. ISSHIKI,
H. MATSUURA, K. SHITASHIMA,
K. TAKEUCHI and S. OHTA

S. EMERSON, P. QUAY and
P. A. WHEELER

N. G. HOGG

G. F. LANE-SERFF

F. SARDÀ and J. E. CARTES

2217 Seasonal and interannual variability of sea surface temperatures in the tropical Pacific, 1969–1991

2229 Phaeopigment distribution during the 1990 spring bloom in the northeastern Atlantic

2243 The β -induced drift of separated boundary currents

2259 Collision and separation of boundary currents

2283 The marine prochlorophyte *Prochlorococcus* contributes significantly to phytoplankton biomass and primary production in the Sargasso Sea

2295 Vertical distribution and daily migrations of hyperiid amphipods in the northern Benguela in relation to water column stratification

2307 Mobile megafaunal activity monitored with a time-lapse camera in the abyssal North Pacific

2325 Water properties and flow over the deep Bering Sea basin, summer 1991

2335 Hydrothermal plumes in the eastern Manus Basin, Bismarck Sea: CH₄, Mn, Al and pH anomalies

2351 Biological productivity determined from oxygen mass balance and incubation experiments

2359 Toward parameterization of the eddy field near the Gulf Stream

2377 A model for Meddy formation

2389 Relationship between size and depth in decapod crustacean populations on the deep slope in the Western Mediterranean

AUTHOR INDEX

Abelmann, A. 1863
Agra, C. 2259
Alder, V. A. 1863
Alldredge, A. L. 1131(RRP)
Artegiani, A. 1365
Ashjian, C. J. 461, 483
Avril, B. 1963

Bacon, M. P. 1569
Baker, E. T. 1559
Ballard, R. D. 1673(I+M)
Barlow, R. G. 2229
Baross, J. A. 1169
Baskaran, M. 849(I+M)
Basturk, O. 1405
Beardsley, R. C. 583
Bergametti, G. 989
Berger, G. W. 339
Berner, H. 1731
Bernstein, S. A. 607(I+M)
Beşiktepe, S. 1815
Bett, B. J. 1767, 2131(RRP)
Bianchi, A. A. 1345, 1703(N)
Bingham, B. L. 1
Boltovskoy, D. 1863
Bond, G. 1009
Borole, D. V. 761
Borowski, C. 419(N)
Boudjellal, B. 791
Boulègue, J. 1241
Boulhadid, M. 791
Bowlby, M. R. 607(I+M)
Brattegard, T. 1225
Breland, J. A. 629(I+M)
Brenner, S. 805
Brundrit, G. B. 1285
Buat-Ménard, P. 989
Buck, K. R. 311
Budéus, G. 1359
Buesseler, K. O. 1569
Burd, B. J. 1141
Burton, J. D. 1043
Bussau, C. 419(N)
Byrne, R. H. 629(I+M), 2115(I+M)

Campbell, L. 2043
Cannon, G. A. 1447
Cartes, J. E. 2389
Case, J. F. 607(I+M)
Charriaud, E. 879(N)
Childress, J. J. 937
Christian, H. A. 1509(I+M)

Churchill, J. H. 1063
Clayton, T. D. 2115(I+M)
Clegg, S. L. 1529
Cochran, J. K. 1569
Collier, R. B. 2061
Conley, D. J. 903
Connors, D. N. 1063
Conte, M. H. 1935
Cook, D. P. 607(I+M)
Cooper, E. B. 2207
Copin-Montégut, G. 1963
Cornet, C. 2295
Cornillon, P. C. 1063
Coste, B. 791
Cowen, J. P. 1559
Croce, N. D. 953
Curry, W. B. 1323(RRP)

Dagg, M. 1431
Dallot, S. 709
Dam, H. G. 883
Danilov, A. I. 561
Danovaro, R. 953
David, P. M. 119
Davies, J. E. 989
Davis, E. E. 1509(I+M)
de Angelis, M. A. 1169
de Lange, G. J. 1731
De Baar, H. J. W. 1307(I+M)
Delcroix, T. 2217
Denis, M. 709
Deuser, W. G. 653
Dickson, A. G. 107
Donnelly, J. 81
Duce, R. A. 1413
Dunn, J. 867(I+M)
Dymond, J. 2061

Eckman, J. E. 151
Eglinton, G. 1087, 1935
Emerson, S. 2351
Emson, R. H. 1475
Eremeev, V. V. 1597
Erlenkeuser, H. 1087

Fabiano, M. 953
Falkowski, P. G. 1205
Feely, R. A. 1559
Felbeck, H. 1241
Fiala-Médioni, A. 1241
Fileman, T. W. 2229
Fine, R. A. 2021

Fischer, G. 1613
 Fischer, J. 1547
 Fisher, N. S. 671
 Fitzgerald, W. F. 1897
 Fowler, S. W. 989
 Fratantoni, D. M. 293
 Gadhoumi, M. H. 1689(I+M)
 Gage, J. D. 1475
 Gamberoni, L. 879(N)
 Gamo, T. 2335
 Garcin, J. 1703(N)
 Garrison, D. L. 311
 Garzoli, S. L. 1379
 Gaspar, P. 395
 Gauzens, A. L. 883
 Geider, R. J. 1205
 Gendron, J. F. 1559
 Gili, J.-M. 2295
 Goericke, R. 2283
 Goldman, J. C. 159
 Gonella, J. 879(N)
 Gooday, A. J. 643, 2131(RRP)
 Gordon, L. I. 805
 Gough, M. A. 2229
 Gouretski, V. V. 561
 Gowing, M. M. 311, 517
 Green, J. C. 643
 Greene, R. M. 1205
 Gregoris, Y. 395
 Gründlingh, M. L. 409(N)
 Guðmundsson, G. 1225
 Guerin-Ancey, O. 119
 Guilivi, C. F. 1345
 Haake, B. 547, 1323(RRP)
 Hall, C. D. 867(I+M)
 Hansell, D. A. 219
 Harbour, D. 1487
 Hareesh Kumar, P. V. 1647
 Heath, M. R. 867(I+M)
 Hebbeln, D. 1731
 Heffler, D. E. 1509(I+M)
 Hilbig, B. 151
 Hill, A. E. 1521(N)
 Hinrichsen, H.-H. 267, 2167
 Hogg, N. G. 1925, 2359
 Holliday, D. V. 445
 Holligan, P. 1487
 Honjo, S. 547
 Hopkins, T. L. 81
 Hudson, R. J. M. 129
 Ichikawa, H. 583
 Ishibashi, J. 2335
 Isshiki, K. 2335
 Ittekkot, V. 547, 1323(RRP)
 Iyer, S. D. 1123(N)
 Jasper, J. P. 653
 Johns, W. E. 293
 Johnson, G. C. 371, 1781
 Kaufmann, R. S. 2307
 Kawase, M. 1259
 Keil, R. G. 967
 Khen, G. V. 2325
 King, B. A. 2207
 Kirchman, D. L. 967
 Kolber, Z. 1205
 Kotovshchikov, B. B. 1597
 Krause, G. 1359
 Kremling, K. 257, 1155
 Kress, N. 805
 Krom, M. D. 805
 Kuhn, G. 739
 Lambert, C. E. 989
 Lancraft, T. M. 81
 Lane-Serff, G. F. 1699(N), 2377
 Lantoine, F. 1747
 Latif, M. A. 1597
 Latun, V. S. 1597
 Le Cann, B. 2077
 Lee, J. H. 1839
 Lefevre, D. 709
 Lemon, M. R. 1447
 Levine, E. R. 1063
 Lilley, M. D. 1169
 Lilly, G. R. 2105(I+M)
 Liss, P. 1487
 Livingston, H. D. 1569
 Lloris, D. 695
 Lochte, K. 727
 Logan, B. E. 1131(RRP)
 Longhurst, A. 2145(RRP)
 Lowenstein, M. R. 607(I+M)
 Lutjeharms, J. R. E. 1285
 Lyle, M. 2061
 MacIntyre, H. L. 1205
 MacIntyre, S. 607(I+M)
 Malin, G. 1487
 Malone, T. C. 903
 Manganini, S. 547

Mantoura, R. F. C. 2229
 Markov, A. A. 1597
 Maroitti, A. 1241
 Mason, R. P. 1897
 Mathew, B. 1647
 Matsuura, H. 2335
 McKnight, D. G. 1003
 Melles, M. 739
 Middelburg, J. J. 1731
 Millard, R. 1009
 Millero, F. J. 1023
 Minster, J. F. 395
 Miquel, J.-C. 989
 Mitchell, R. B. 867(I+M)
 Mitchelson-Jacob, E. G. 1521(N)
 Morel, F. M. M. 129
 Morley, N. H. 1043
 Müller, P. J. 425
 Murphy, D. J. 849(I+M)
 Murty, V. S. N. 205

Nair, R. R. 1323(RRP)
 Nakayama, E. 2335
 Napp, J. M. 445, 883
 Narayanan, S. 2105(I+M)
 Nelson, J. R. 1793
 Neori, A. 805
 Neveux, J. 1747
 Nof, D. 235, 2243, 2259
 Nowlin, W. D. Jr. 169

Oguz, T. 1405, 1597
 Ohta, S. 1241, 2335
 Olson, D. B. 235
 Olson, E. J. 1169
 Orr, J. C. 849(I+M)
 Orsi, A. H. 169
 Ortner, P. B. 445
 Os, B. van 1713
 Özsoy, E. 1597, 1815

Park, Y.-H. 879(I+M)
 Paschini, E. 1365
 Pashinski, D. J. 1447
 Passow, U. 1131(RRP)
 Pfannkuche, O. 727
 Pieper, R. E. 445
 Pike, S. E. 903
 Pinardi, N. 1365
 Pineda, J. 2179
 Pingree, R. D. 2077
 Piola, A. R. 1345
 Poisson, A. 1689(I+M)
 Poynter, J. 1087

Prahl, F. G. 2061
 Pratt, D. N. 2131(RRP)
 Prieur, L. 709
 Probert, P. K. 1003

Quadfasel, D. 777
 Quay, P. 2351
 Quétel, C. R. 989

Raimbault, P. 791
 Ramaswamy, V. 1323(RRP)
 Rao, D. P. 205
 Rao, R. R. 1647
 Reed, R. K. 2325
 Remoudaki, E. 989
 Reys, J.-P. 709
 Rhein, M. 267, 2167
 Rice, A. L. 1767
 Risović, D. 1459
 Ritchie, B. J. 867(I+M)
 Rixen, T. 1323(RRP)
 Roman, M. R. 883
 Rommets, J. W. 1307(I+M)
 Rucabado, J. 695
 Rudels, B. 777
 Rutgers van der Loeff, M. M. 339

Sakai, H. 2335
 Santschi, P. H. 849(I+M)
 Sardà, F. 2389
 Sarnthein, M. 1087
 Savenkoff, C. 709
 Saydam, C. 1405
 Schink, D. R. 849(I+M)
 Schneider, R. 425
 Schriever, G. 419(N)
 Schüssler, U. 257
 Shitashima, K. 2335
 Sieracki, M. E. 1793
 Simon, M. 967
 Smith, K. L. Jr 2307
 Sparrow, M. A. 2061
 Speer, K. G. 925, 1925
 Sprintall, J. 827
 Stabeno, P. J. 2325
 Statham, P. J. 1043
 Stefanescu, C. 695
 Stoecker, D. K. 1793
 Stoll, M. H. C. 1307(I+M)
 Stolzenbach, K. D. 359
 Streu, P. 1155
 Strom, S. L. 57
 Sudhakar, M. 1123(N)
 Sur, H. I. 1597

Suryanarayana, A. 205
Svavarsson, J. 1225
Sy, A. 777

Takeuchi, K. 2335
Thiel, H. 419(N)
Thistle, D. 151
Thomas, F. 395
Thomson, R. E. 1141
Thuesen, E. V. 937
Tomczak, M. 13, 827
Toole, J. M. 371, 1009, 1973
Torres, J. J. 81
Tugrul, S. 1405
Turley, C. M. 643, 2193
Turner, S. 1487
Tyler, P. A. 1475

Ünlüata, Ü. 1597, 1815

Valentine, H. R. 1285
Vaulot, D. 2043
Verity, P. G. 1793
Verkhunov, A. V. 2325
Veronis, G. 1839

Visbeck, M. 1547
Visser, H.-J. 1713
Vladimirov, V. V. 1597

Wakefield, W. W. 2307
Wang, D.-P. 1187
Ward, B. B. 219
Warren, B. A. 1973
Wefer, G. 1613
Welschmeyer, N. A. 967, 2283
Wente, M. 671
Westerhausen, L. 1087
Wheeler, P. A. 2351
Whitfield, M. 1529
Whitworth, T. 169
Widder, E. A. 607(I+M)
Williams, P. M. 219
Wishner, K. F. 483

You, Y. 13
Young, C. M. 1, 1475

Zantopp, R. J. 293
Zenk, W. 1925
Zhang, J.-Z. 1023
Zhuang, G. 1413

